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山东昌乐早始新世五图组古乏齿兽类(哺乳纲)[1)]

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摘要 山东五图古乏齿兽类标本保留了原始真兽类的齿式和齿尖配置，与北美古新世 *Amelotabes simpsoni* 最为相似。但与后者有明显的差异，故另立属种：*Auroratherium sinense*。古乏齿兽类是一类已绝灭的哺乳动物，材料稀少，以前只见于北美早第三纪地层中。其起源不清，在归类上也有不同的意见。山东标本的发现是北美以外地区的首次记录，同时也表明了这种动物虽然数量不多，却散布在早第三纪的北美和亚洲两大陆。

关键词 山东五图，早始新世，古乏齿兽类

中图法分类号 Q915.873

古乏齿兽类(palaeanodonts)是一类已绝灭了的、适于掘土生活的小型哺乳动物，其分类位置还有争论。这类动物最初曾归入灵长类(Wortman, 1903)，也曾归入单孔类(Douglass, 1905)，也有以为是与非洲金毛鼹相似的食虫类(Matthew, 1906, 1910; Gregory, 1910)，还有人认为和管齿类有关(Jepsen, 1932)，但通常认为这类动物与贫齿类或鳞甲类有关(Osborn, 1904; Matthew, 1918; Simpson, 1927, 1931; Ermy, 1970; Rose, 1978 等)。古乏齿兽亚目是由 Matthew (1918) 建立的，包括两个科：Metacheiromyidae 和 Epoicotheriidae，前者的头骨一般较长，犬齿后方的牙齿都退化成单根的钉状齿，并且上颌骨和下颌骨后部无牙齿，而在下颌骨的后内侧有发育的“近中侧支架”(“medial buttress”)。后一个科的成员都有较短的头骨，上、下颌骨的后部都有牙齿。五图标本虽然不完全，但显然是一种 Epoicotheriid 状的古乏齿兽类。

古乏齿兽类化石见于北美早第三纪地层，但并不常见。其地史记录可回溯到古新世的 Tiffanian 期，延续到渐新世。在五图古乏齿兽类发现之前，这类动物的分布范围只限于北美大陆。因此，五图化石不仅是亚洲第一块古乏齿兽类标本，也是北美以外地区的首次记录。

一、化 石 记 述

本文记述的古乏齿兽标本产自山东五图盆地昌乐县煤矿，简称县矿。在早始新世煤

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层中产有食虫类昌乐鼩(*Changlelestes*)(童永生、王景文，1993)、多瘤齿兽类拟间异兽(*Mesodmops*)(童永生、王景文，1994)、食果猴类古灵长类(*Chronolestes* 和 *Carpocristes*)(Beard and Wang, 1995)、副鼠类啮齿类(*Acritoparamys*、*Taishanomys*)(Tong and Dawson, 1995)、和原始奇蹄类等三十多种哺乳动物。这里记述的古乏齿兽类化石是1993年夏采集的，包括一个侧向压偏的不完整的头骨和左右下颌骨(IVPP V10703)，这些化石是从一小块炭质泥岩上修理出来的，可认为是同一个体。

下颌骨细长，水平支从犬齿到m3几乎等高。犬齿之前的下颌骨向前迅速地变浅，形成壶咀状。下颌骨联合部未愈合，向后伸至p3前缘的下方。在m3内侧下颌骨稍稍加厚，形成不明显的"近中侧支架"(medial buttress)，在"近中侧支架"下方有很弱的沟，隐隐约约地从下颌孔水平地伸向m3的下方，有人称之为"下颌骨内侧沟"(internal mandibular groove)。有两个颏孔，分别在p1和p3的下方。上升支与m3之间有一段长的间隔(约6mm)，m1处下颌骨高为4.5 -4.6 mm。髁状突低，与角突之间有一半圆形的凹。角突细长向后突出(图1)。

齿式：1,1,4,2? / 1,1,4,3。

下门齿一个，相对粗壮，横切面呈卵形，前锐后钝。除顶端磨蚀面外，齿冠由釉质层覆盖，釉质层薄。与下犬齿之间有1.3mm齿隙。

下犬齿大，直立。横切面呈三角形，前外侧面和内侧面微隆，釉质层完全覆盖，两侧相汇形成牙齿前方的锐脊。后侧面微凹，釉质层已被磨蚀。与第一下前臼齿之间有1.4mm的齿隙。

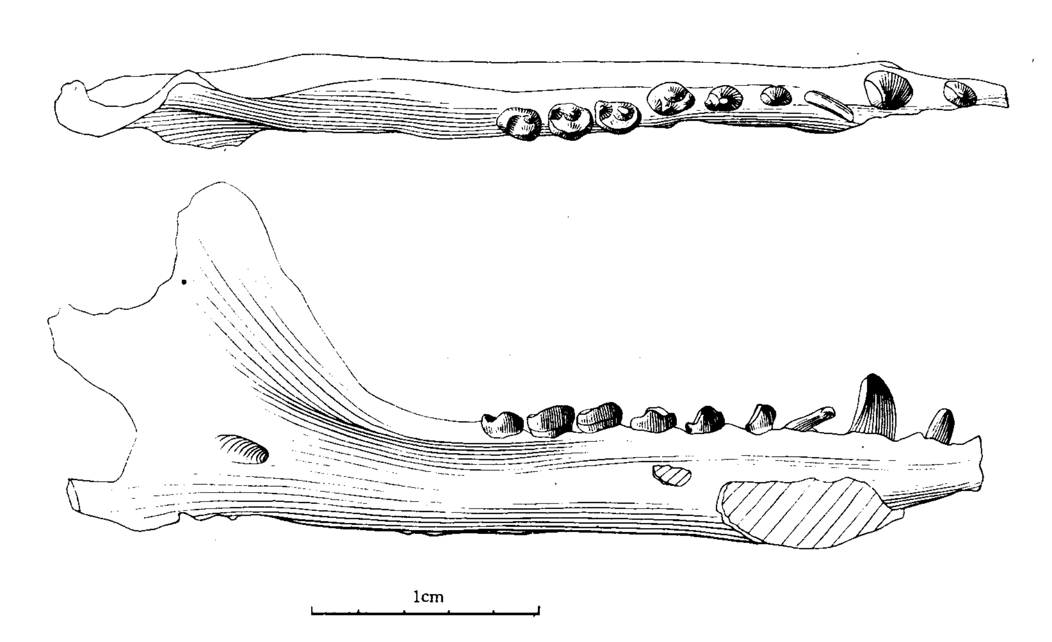


图1 中华晨兽，左下颌骨(IVPP V10703-2)冠面视(上)和舌侧视(下)

Fig.1 *Auroratherium sinense* gen. et sp. nov.

occlusal and lingual views of left mandible with i1-m3

下前臼齿之间都有齿隙，因此，各个牙齿孤立。与其他原始真兽类一样，从 p1 到 p4 臼齿化程度依次增大。在以往的资料中尚未见到下前臼齿齿饰的详细的记述，因而有必要加以描述。

p1 是颊齿中最小的一颗牙齿，单根，单尖，齿冠由釉质层覆盖。

p2 外形与犬齿相似，但小得多。后侧面仍有釉质层，仅在主尖的顶端被磨蚀。

p3 由一个大的主尖和一个小的后跟尖组成。主尖圆钝，在主尖的前方有一个很小的突起。后跟尖低，位于主尖后内侧基部的后方。

p4 已可以分出三角座和跟座，三角座由下原尖、下后尖和下前尖组成，下原尖大，下后尖次之，位于下原尖的唇侧，下前尖小，在牙齿前缘的中间。齿尖呈锥状，齿尖间的连脊不发育。跟座低、窄小，呈半圆形，仅在舌侧有一清晰的突起。从下颌骨内侧的破裂可以看到，p4 两齿根已愈合，但仍有两根之间的凹沟，末端分叉。p4 与下臼齿之间也有短的齿隙。

三个下臼齿排列相对紧密，牙齿之间齿隙较小。下臼齿冠低，呈椭圆形，咀嚼面上的釉质层已磨蚀，仅在牙齿四周保存。在 m1 和 m2 上，唇侧有两个明显的突起，前面的一个较大，后方的较小，推测分别相当于其他真兽类的下原尖和下次尖。另外，在牙齿的前缘有一个、在舌侧有两个很不明显的突起，或许前缘的一个相当于下前尖，舌侧的两个分别是下后尖和靠前的下内尖。m1 和 m2 的跟座比三角座窄小，从侧面看，也较低。m3 尺寸较小，跟座明显退化，下次尖小，而下内尖清楚。

在破碎的头骨标本上保留了部分牙齿，计有左侧的一不完整的上门齿、左右上犬齿、左 P3、M1、和 P1、P2、P4 及 M2 的齿槽。还有两颗零散的牙齿：一侧卧在腭骨上的单根齿可能是同一个体的左 P2，而在右前上颌骨外壁上的一小的单根齿有可能是左 P1。右侧上颊齿除犬齿外已完全脱落。

左上门齿仅存下部齿冠，不大，断面呈椭圆形，前后延长(长: 1.0mm)，有薄的釉质层，外侧较平坦。门齿和犬齿之间有较大的齿隙。

上犬齿强壮，横切面成三角形，外壁和前壁平，内侧壁微凸(长: 2.4mm，宽: 1.3mm)。

左上颌骨的 P1 齿槽紧挨犬齿，两者之间的齿隙似不大。另有一单个的牙齿附在右前上颌骨侧面上，牙齿小，齿根后斜，因其尺寸和齿根延伸的方向与左上颌骨上的 P1 齿槽形态相对应，所以推测是脱落的左 P1。P1 小，单尖，有釉质层覆盖(长: 0.9mm)。

P2 齿槽大，侧卧在腭骨上的单根齿大小与之相适。P2 比 P3 稍小，从外侧视呈不对称的三角形，前缘较陡，后缘较缓。外壁微凸(长: 1.1mm)。

P3 单根，牙齿前后延长，主尖高大，呈扁锥状，主尖前缘较陡，后缘较缓。后缘基部有一不明显的小尖，主尖的舌缘有弱的内齿带(长: 1.5mm，宽: 1.2mm)。

P4 的齿槽比 P2 大得多，似乎是上颊齿中最大的一颗牙齿。

M1 冠面呈圆角的三角形，唇侧前尖和后尖基部相连，前尖比较发育。牙齿的前外角向前突出，前尖和后尖前后延长，构成延长的唇侧齿尖列。原尖大，但前后延长，形成和唇侧齿尖相对应的舌侧纵脊。唇侧和舌侧纵脊之间是一纵向的凹槽(长: 1.9mm，宽: 1.5mm)。

在 M1 后面有一大小与 P2 齿槽相近的齿槽。在这一齿槽后面的上颌骨已破裂，是否

有另一齿槽存在难以断定。因此，在推断齿式上有不确定之处。如果 M1 后方只有一个齿槽，那就只有两个臼齿。当然，还有另一种可能性，在 *Alocodontulum atopus* 的上颊齿中，M1 是最大的，在五图标本上，犬齿后方的第四颗牙齿最大，所以可能只有三颗前臼齿和三颗臼齿。这一推测也有不足之处，与 *A. atopus* 相比，一是后方犬齿的第三颗牙齿过于简单，似乎不可能是 P4；二是保存的最后一齿槽要比北美种的 M3 大得多。因而，这里暂时假定：五图种有四颗前臼齿和二颗臼齿(?)。

表 1　下颊齿测量（单位：毫米）

Table 1　Measurements (in mm)

i1		c1		p1		p2		p3		p4		m1		m2		m3	
L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W
1.0	0.8	1.8	1.3	---	---	1.0	0.8	1.7	1.0	2.0	1.5	2.0	1.4	2.1	1.5	1.8	1.3
1.1	0.8	2.1	1.5	0.8	0.6	1.0	0.8	---	---	1.9	1.4	2.0	1.5	2.0	1.5	---	---

二、与已知的古乏齿兽类比较

北美古乏齿兽类的材料不多，据 Rose(1978) 统计约有 50 个标本，在古乏齿兽类的两个科中，Metacheiromyidae 只有三个属：*Metacheiromys*、*Palaeandon* 和 *Propalaeanodon* (Rose, 1979)；相对来说，Epoicotheriidae 更加分化，已知的有七属。epoicotheriids 和 metacheiromyids 有时也很难区分，常有一些形态居于两科典型成员之间的种类。Rose 等(1991)记述的 *Dipasalus oryctes* 就是一例。这种古乏齿兽的犬齿后方牙齿退化和下颌骨有"近中侧支架"和下颌骨内侧沟，使其与 metacheiromyids 很接近，但头后骨骼相当特化，与 epoicotheriids 一致。又如 Simpson (1959) 记述的 *Tetrapassalus*，正如原作者所述的那样，犬齿后方的第二、三个牙齿呈钉状(peg-like)，这样的牙齿通常见于 metacheiromyid 标本上。当然，五图标本不存在这个问题，是一种典型的 epoicotheriid。

Epoicotheridae 科的七个属产出层位和特征简述如下：

Amelotabes 是最古老的古乏齿兽类，材料只一个右下颌骨(PU 14855)，产于怀俄明州 Big Horn 地区的 Polecat Bench 组的 Croc Tooth Quarry 层。犬齿后方有七颗牙齿，除第一颗牙齿单根外，其余为双根齿。牙齿虽然已磨蚀，但仍保留齿尖的痕迹。下犬齿比较大，下颌骨上有弱的"近中侧支架"和下颌骨内侧沟，釉质层退化。因此，有人以为这个属既很像是 Epoicotheriidae 科的祖先，似乎又可能是 Metacheiromyidae 科的祖先。

Tubulodon 只有一个种(*T. taylori*)，主要材料是不完整的左、右下颌骨，产于怀俄明州 Wind River 组上部(Lost Cabin 层)。在犬齿后方至少有四颗牙齿，牙齿低冠，除最后牙齿外都是双根齿。

Pentapassalus 是 Gazin(1952) 建立的，现有两种：*P. pearcei* 和 *P. woodi* (Rose, 1978)。属型种产于怀俄明州 Green River 盆地始新世 Knight 层上部，归入种 *P. woodi*

出自 Wind River 盆地，材料较多。*P. pearcei* 的齿式为 ?,1,2,3 / 1,1,3,3，两个上前臼齿单根，前两个臼齿三根，Gazin 推测下前臼齿和最后一个臼齿是单根齿。也有弱的“近中侧支架”，上升支与水平支几乎垂直。*P. woodi* 比属型种更为粗壮。

Alcodontulum（即 *Alocodon*）为单型属，属型种 *A. atopum* 产于怀俄明州 Big Horn 盆地 Willwood 组下部（始新世早期），材料只有一个右上颌骨。其上齿式是 1(+?), 1,4,3, P1 和 P2 小，为单根齿；M1-2 有纵向凹槽，齿尖沿牙齿的舌侧缘和唇侧缘纵向排列；M3 很退化。后来，Rose 等（1992）将采自同一盆地的 MP-152 地点（密执根大学地点号）的 UM 93740 标本归入 *A. atopum*。这一标本保存了部分头骨、下颌骨和头后骨骼，下犬齿后面有六颗牙齿。

Dipassalus 产于怀俄明州Wind River 盆地的 Lysitean-Gardnerbuttean 期地层中。正如属名所说的那样，下犬齿后方仅有两颗牙齿。牙齿成钉状，且有较发育的下颌骨“近中侧支架”，虽然其他 epoicotheres 也有“近中侧支架”，但不如 *Dipassalus* 那样明显。

Tetrapassalus 从属名可以看出其犬齿后方有四个颊齿。这也是一个单型属，产于怀俄明州 Green River 盆地的“Misery Quarry”，中始新世 Bridger 组上部。

Epoicotherium 和 *Xenocranium* 出现在 Chadronian 期，Chadronian 期现在有人认为是晚始新世。在 *Epoicotherium* 的上颌骨上有五颗犬齿后方牙齿，前面三颗牙齿大小大致相等，第四颗牙齿较小，第五颗牙齿最小；在下颌骨上也有五颗牙齿，第二、第三颗牙齿大小相近，第一、第四颗稍小，而第五颗则最小。*Xenacranium* 上犬齿后方有四颗牙齿，第四颗牙齿最小；在下犬齿后方五颗牙齿中，第五颗牙齿最小。这两个属的生活方式可能与非洲现生的金毛鼹相近，适于地下穴居生活。

从上述的已知属基本情况可以看出，五图下颌骨标本的“近中侧支架”和下颌骨内侧沟很弱，下颊齿齿冠低，并有齿尖，这些情况与 *Amelotabes*、*Alocodontulus* 和 *Tubulodon* 相似，与其他古乏齿兽区别较大，在犬齿后方的牙齿数目上与 *Amelotabes* 一致。与 *Amelotabes* 的区别在于 p1 更加退化，p2 缺少明显的下前尖，p3 跟座很小，不像北美属那样长且宽，m1 稍大于 m2，下臼齿未见下前脊的遗存，前后齿根已愈合。与 *Tubulodon* 的区别除犬齿后方牙齿较多外，还在于 p4 具有清楚的下前尖和下后尖，下臼齿除下原尖和下次尖外其他齿尖很容易被磨蚀。五图标本与 *Amelotabes* 和 *Tubulodon* 不同还在于，上升支前缘不像北美的两个属就在 m3 后方升起，倒像 *Pentapassalus* 那样，上升支前缘与 m3 之间有一小段距离。

Alocodontulus 也具有完全的上颊齿，并有齿尖。在山东的破碎头骨标本上保存了两颗犬齿后方颊齿（P3 和 M1），颊齿上齿尖清楚。P3 比较简单，牙齿形态不如 *Alocodontulus* 的 P3 那样复杂。五图的 M1 呈三角形，唇侧齿尖列只有两个齿尖，舌侧只具一个前后延长的齿尖。而 *A. atopus* 臼齿，不论是 M1 或是 M2，牙齿呈前后延长的四边形，唇侧和舌侧齿尖列是由更多的齿尖组成，而且位置更接近牙齿的边缘。在五图标本上的犬齿后第三颗牙齿远比 *A. atopus* 的 P3 或 P4 简单。在 MP-152 地点发现的下颌骨标本上，犬齿后方有六个牙齿，其中，p4 留有齿饰的痕迹，可能是与下原尖连结的下前尖或向近中侧突出的下前脊，在舌侧有下后尖，下跟座较低、较宽，似有三个齿尖；m1 双根。五图下颌骨标本犬齿后方有七颗牙齿，p4 下前尖小，突出在牙齿的前缘的中部

角，下前脊不发育；下后尖则较大，与下原尖连脊也不发育；跟座窄小，由单一后跟尖组成；下臼齿前、后齿根已愈合。

从上面比较中看出，五图古乏齿兽标本与北美的 *Amelotabes*、*Tubulodon* 和 *Alocodontulum* 最为相似，但也有一些显著的差异。

五图古乏齿兽标本归类和基本特征概述如下：

鳞甲目？ Pholidota Weber，1904

古乏齿兽亚目 Palaeanodonta Matthew，1918

侨兽科 Epoicotheriidae Simpson，1927

中华晨兽 *Auroratherium sinense* gen. et sp. nov.

（图 1；图版 I）

正型标本 不完整的头骨和左右下颌骨，头骨上保存一左上门齿，左右犬齿，在 P3，M1 和两颗零散的上前臼齿；左下颌骨有一下门齿，下犬齿和七颗犬齿后颊齿，右下颌骨 m3 已脱落(IVPP V10703)。

地点和层位 山东昌乐五图盆地县矿；五图组，早始新世。

特征 齿式：1，1，4，2? /1，1，4，3。下前臼齿间有短的齿隙，p1 小，p2 缺少下前尖，p3 由大的下原尖和小的后跟尖组成，p4 下前尖和下后尖清楚。下臼齿冠低，前后齿根已愈合，嚼面上下原尖和下次尖发育，但其他齿尖似乎很容易被磨蚀掉。P3 简单，主尖侧扁；上臼齿呈圆角的三角形，唇侧齿尖列由前尖和后尖组成，舌侧齿尖列短，由前后延长的原尖组成。下颌骨细长，水平支前后几乎等高，具有很弱的“近中侧支架”和内侧下颌骨沟。

词源 属名由拉丁文“aurora”(晨)和兽类属名常用后缀“therium”组成；种名为现代拉丁语“sinensis”(中国的)，指产地。

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A NEW PALAEANODONT (MAMMALIA) FROM THE EARLY EOCENE OF WUTU BASIN, SHANDONG PROVINCE

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Key words Wutu, Shandong, Early Eocene, Palaeanodonta

Summary

A new palaeanodont, *Auroratherium sinense*, was discovered in the Wutu Formation in 1993. Palaeanodonts are a rare group of fossorially adapted mammals, which up to now has been found solely in North America from the Paleocene to the Oligocene. This initial discovery suggests that palaeanodonts may also be widely, but rarely, distributed in the Paleogene of Asia. Associated with the specimen are other mammals, such as *Changlelestes* (Soricomorpha), *Mesodmops* (Multituberculata), Alagomyid, Paramyid and ctenodactyloid rodents, carpolestid primates, and primitive perissodactyls.

Order ? Pholidota Weber, 1904

Suborder Palaeanodonta Matthew, 1918

Family Epoicotheriidae Simpson, 1927

***Auroratherium sinense* gen. et sp. nov.**

(Fig.1; Pl.1)

Type A crushed skull with associated mandibles (IVPP V10703).

Locality and horizon County Coal Mine, 2km east of Wutu Village of Changle County, Shandong Province; Wutu Formation, Early Eocene.

Diagnosis Dental formula possibly complete, with seven lower postcanines and at least six upper postcanines. Premolars separated from each other by short diastemata, p1 small, p2 without paraconid, p3 consisting of a large protoconid and small heel cusp, p4 paraconid and metaconid clear, with a low, narrow talonid; lower molars low-crowned, with two definite swellings homologous with protoconid and hypoconid in other eutherians; P3 simple, with laterally compressed main cusp; M1 triangular in outline, with two longitudinal cusp rows, labial cusp row involving paracone and metacone, lingual row containing only an elongated protocone. Horizontal ramus of nearly uniform depth, with weak "medial buttress" and indistinct internal mandibular groove. Ascending ramus rises at a point about 6mm behind m3.

Description The skull specimen is deformed and somewhat crushed, together with lower jaws. The main characters are as follows.

The horizontal ramus of the mandible is of nearly uniform depth beneath the cheek teeth, and the depth of it beneath m1 is 4.5mm. A less developed "medial buttress" is present posterior to m3; a feeble internal mandibular groove, beneath the "medial buttress", anteriorly extends from mandibular foramen. Anterior to the incisor, the lower jaw tapers abruptly, forming a shallow spoutlike projection. Symphysis is infused, back to a point beneath p3. Two mental foramina open beneath p1 and p3, respectively. The ascending ramus rises to about 60° from the line of the tooth row. Its anterior edge is about 6mm behind m3, quite similar to that of *Dipassalus oryctes* and *Pentapassalus pearcei*. The coronoid process is high. The condyle is slightly higher than the cheek tooth row, and separated widely from the angular process by a U-shaped concavity. The angular process is deformed, but is deflected sharply backward.

The dental formula is 1,1,4,2? / 1,1,4,3. The single upper and lower incisors are covered by thin enamel, and are separated from canines by relatively long diastemata. The lengths of I1-C1 and i1-c1 are 1.3mm, and ca. 3mm, respectively. The upper and lower canines are strong, with triangular cross-section, they are also covered by enamel. The lower premolars are separated from each other by short diastemata, and show increased molarization from the first to the last, as those in other primitive eutherians.

p1 is the smallest tooth in the postcanines. It is simple, single-rooted, and covered by enamel. The length of c-p1 diastema is 1.4mm.

p2 is similar to lower canine in outline, but much smaller than the latter.

p3 consists of a large main cusp and low small heel cusp. The main cusp is obtuse, anterior to which there is an indistinct swelling. The heel cusp is posterior to the posterolingual base of the main cusp.

p4 has a large trigonid consisting of protoconid, metaconid, and paraconid, and a low and narrow talonid. The protoconid is robust, the metaconid is distinct lingual to the protocone, and the paraconid is small, situated at median of anterior edge. The cusps are conical, and no crest is present. The talonid is semicircular, with a distinct swelling at the lingual part. The roots are mostly fused, but branch off at the ends.

Three lower molars are brachydont, and elliptical in outline. The enamel on the occlusal surface has worn through, but two definite swellings remain on m1 and m2, and are probably homologous with the protoconid and hypoconid in other primitive eutherians because they are near the labial edge of the teeth. In addition, there are three obscure swellings at the lingual edge, probably homologous with the paraconid, metaconid, and entoconid, respectively. m3 is the smallest lower molar. The talonid is

reduced, and the hypoconid less developed.

The laterally compressed and fragmentary skull retains an incomplete left upper incisor, canines, left P3, M1, and P1, P2, P4 and M2 alveoli. In addition, there are two isolated teeth, possibly to P1 and P2.

The upper incisor is small, with elliptical cross-section. The upper canine is strong. There are two alveoli posterior to upper canine. An isolated tooth in the right premaxilla is thought to P1, it is the same size as the upper incisor, with a single cusp. And the other isolated tooth attached to the palate is assumed to be left P2, which is smaller than P3, and lopsided triangular in labial view.

P3 is single-rooted, the main cusp is elongated anteroposteriorly, with a feeble lingual cingulum. Absence of metacone and protocone distinguishes it from P3 of *Alocodontulum atopum*.

P4 alveolus is large, it seems to be the largest tooth among the upper postcanines.

M1 is basically triangular in occlusal surface, with a long labial cusp row and a short lingual row. The labial cusp row contains paracone and metacone, and the lingual consists only of an elongated protocone. The labial and lingual cusp rows are separated by a less developed longitudinal furrow. There is an alveolus behind the molar. It appears to be smaller than P4, but not as small as M3 alveolus of *A. atopum*.

Comparison The unusual specimen from the E. Eocene Wutu Formation is the closest to *Amelotabes* from the late Paleocene (Tiffanian) of the Bighorn Basin, North America. Both Asiatic and North American genera share alike lower dental formula, cuspate cheek teeth, and reduced enamel. The dental morphology of the Shandong specimen differs widely from the latter. Compared with the North American genus, the new species has a reduced p1, p2 without paraconid, p3 with small talonid, m1 slightly larger than m2, lower molars lacking paracristid, and anterior and posterior roots fused. The new species also bears a certain resemblance to *Tubulodon taylori*, but it possesses more postcanine teeth, more complicated p4 with definite paraconid and metaconid, and molar lingual cusps easily worn off. A lightly worn m1-2 (CM 34854) referred to *T. taylori* was described by Rose *et al.*, (1991). Cusp homologies are unclear on this referred specimen. It appears that the lower molars have a distinct metacristid, two lingual and three labial cusps on the trigonid of m1, and three or four peripherally arrayed cusps on the talonid, based on their refined illustration. But in the Wutu molars no definite cusps except the bulbous protoconid and hypoconid is discernible. An interesting difference between the two North American genera and the new genus is the presence of a short space between the last molar and the anterior edge of the ascending ramus in the latter, whereas in *Amelotabes* and

Tubulodon, the anterior edge of the ascending ramus rises just posterior to m3.

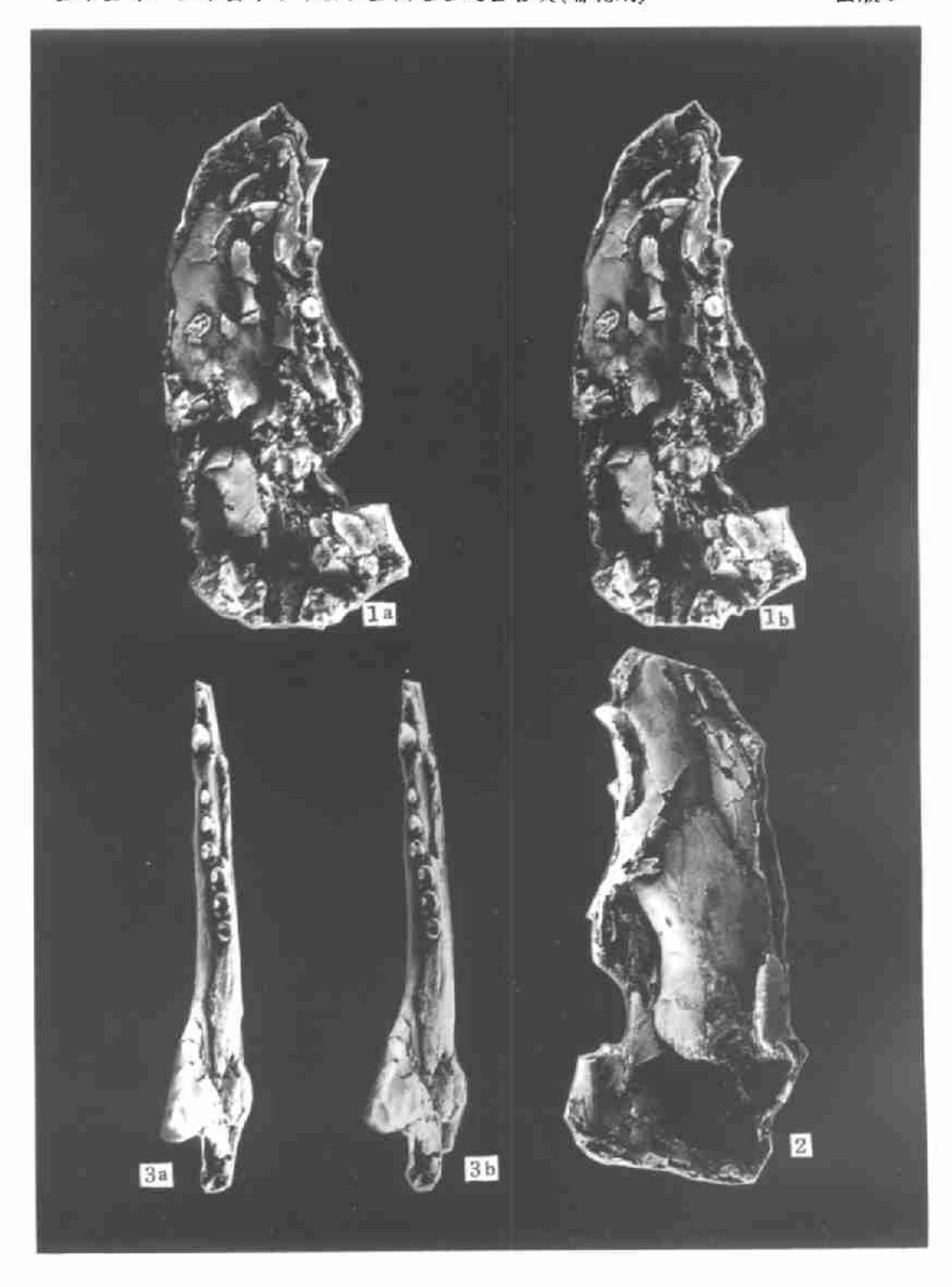
Alocodontulum atopum also has a nearly complete dental formula and cuspate cheek teeth, seven upper postcanines (Rose *et al.*, 1977) and six lowers (Rose *et al.*, 1992). In the Shandong specimen the number of upper postcanines is uncertain, at least six, and there are seven lower postcanines. The Wutu genus and *Alocodontulum* have cuspate postcanine teeth. A comparison of the specimen with figures and descriptions of the North American genus, given by the original authors, however, shows that the upper cheek teeth are less specialized. The third postcanine of the new species is single-rooted, and consists of one large cusp, but in *A. atopum*, P3 has three roots, a high, large paracone, a diminutive metacone, and a low bulbous protocone. M1 of the Wutu specimen is triangular in outline, and has only three main cusps, whereas in the North American specimen, M1 is rectangular, with lingually and labially arranged cusp rows, separated by a deep longitudinal furrow. A skeleton from UM locality MP-152 of the Bighorn Basin is recently referred to *A. atopum* (Rose *et al.*, 1992). p4 of this specimen has a wider, lower talonid with faint enamel expansions suggesting three talonid cusps. In the Wutu specimen, the p4 talonid, however, is much narrower and smaller than its trigonid. The ascending ramus rises just posterior to m3 in the North American genus, also differentiates *A. atopum* from the new genus.

The other genera assigned to the Epoicotheriidae, *Pentapassalus*, *Dipassalus*, *Tetrapassalus*, and *Epoicotherium*, have a reduced number of postcanines. It is easy to separate the Wutu specimen from them.

图版 I 说明 (Explanations of plate I)

中华晨兽(*Auroratherium sinense* gen. et sp. nov.) x2

1. 不完整的头骨(IVPP V10703-1), 腹视(ventral view of crushed skull);
2. 不完整的头骨(IVPP V10703-1), 背视(dorsal view of crushed skull);
3. 左下颌骨(IVPP V10703-2), 冠面视(occlusal view of left mandible)


1a
1b
3a
3b
2